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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,341	10/15/2001	Takashi Terauchi	50090-449	9211

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EXAMINER

POMPEY, RON EVERETT

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/976,342

Applicant(s)

GOTTFRIED, MARK

Examiner

Ron E Pompey

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jang (US 5,654,212) in further view of Cunningham (US 6,208,004).

Jang discloses the limitations of:

For claims 1, 4 – 6, 9 and 11:

forming gate interconnections (435, fig. 4B) on the gate oxide film, each gate interconnection including a first silicon film and a dielectric film;

forming a first diffusion layer (445, 450 fig. 4B) by means of implanting an impurity in the substrate;

forming after formation of the first diffusion layer, a second silicon film (455, fig. 4C) over the side surfaces of the first silicon film;

thermally oxidizing the second silicon film (465, fig. 4F);

forming a second diffusion layer (480 fig. 4G) that is higher in impurity concentration than the first diffusion layer (col. 6, ln. 19 – col. 7, ln. 34 and col. 9, lns. 1-5). It is inherent that when the source and drain regions 475 are formed and the spacers 460 are uncovered that they will be doped. Also, you can use the oxidized

spacer to control the length of the LDD region, by implanting after oxidizing to the desired length.

3. Jang discloses the limitations of 1-3, 6-8, 10 and 11, except for what Cunningham discloses which is:

wherein each of the gate interconnections includes a silicide film (110, fig. 1) interposed between the first silicon film, which is a doped silicon, (106, fig. 1) and the dielectric film (112, fig. 1),

the second silicon film (114 a, b, fig. 1) covers side surfaces of the first silicon film and those of the silicide; and

wherein thermally-oxidizing the second silicon film, thereby forming a thermal oxide film with a bird's beak (131 a, b, fig. 1) extending into the interface (col. 6, Ins. 6 – 63).

Therefore one of ordinary skill in the art would combine Jang and Cunningham because the silicide reduces the resistivity of the gate structure and the bird's beak lowers the area's electric field.

Jang and Cunningham disclose all the limitations of claims 8, 12, 13 and 14 except for the temperature range and the range of second silicon layer is oxidized. However has been held that discovering an optimum or working range involves only routine skill in the art.

Response to Arguments

4. Applicant's arguments filed 4-29-03, pertaining to claims 1-14, have been fully considered but they are not persuasive. The applicant traverses the rejection of

optimization of temperature ranges, without explaining why he traverses the rejection. One of ordinary skill knows that formations of polysilicon by LPCVD method would incorporate the temperature range as disclosed by applicant claims.

One of ordinary skill in the art would replace the spacers 440 and 460/465 in Jang with the spacers 114 and 120 in Cunningham in order to dictate the offset of the deep source and drain of the MOS device as well as the other reasons indicated above.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Art Unit: 2812

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (703) 305-3016.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


Ron Pompey
Art Unit; 2812
July 10, 2003


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800